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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/006,713	12/10/2001	Mikael Lundblad	024445-007	3580

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EXAMINER	
WALSH, BRIAN D	

ART UNIT	PAPER NUMBER
3722	

DATE MAILED: 12/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/006,713	LUNDBLAD, MIKAEL	
	Examiner	Art Unit	
	Brian D. Walsh	3722	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 October 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). ____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

FINAL ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 16 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Nachtigal et al.

Regarding claim 1, Nachtigal et al. discloses a method for damping vibrations in a machining operation comprising the steps of a. causing a sensor to detect an oscillatory motion of a tool (Col. 7, lines 52 – 57), b. causing a control device (74) to identify the frequency of the oscillatory motion detected in step a. (Col. 7, lines 52 – 63); and c. causing a vibration device to generate a mechanical damping force having substantially the same frequency as the frequency identified in step B and applied to the tool in counter-direction to the oscillatory motion and out of phase by other than 180 degrees (Col. 7, line 51 – Col. 8, line 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 – 12, 14, 16, 18 – 29 and 31 are finally rejected, as necessitated by amendment, under 35 U.S.C. 103(a) as being unpatentable over Huang et al. in view of Redmond et al and in further view of Nachtigal et al.

Regarding claims 1, 16 and 18, Huang et al. discloses an apparatus and method for controlling vibrations during a machining operation. Huang et al. discloses a sensor to detect vibrations of a workpiece during machining and a control device to identify, compare and produce an error signal (compensating signal) to the vibration detected to be used by damping mechanism in order to minimize or eliminate the vibration (Col. 3, lines 24 – 26, 29 – 33 and 53 – 65).

However, Huang et al. fails to disclose that the sensor and damping force generator are located on the machine tool, rather on the workpiece support structure.

Redmond et al. discloses a nearly identical structure and method with a mere reversal of parts wherein the sensing and damping equipment are located on the machine tool itself.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the vibration damping apparatus and method of Huang et al. to reverse the location of the sensing and damping equipment such that they are located on the cutting tool itself since Huang et al. discloses the placement of these elements on the tool can be used to dampen vibrations while not interfering with cutting operations or cooling (Abstract, lines 6 – 8).

Regarding claims 2 – 10 and 19 – 27, Huang et al. and Redmond et al. disclose all of the elements as set forth above. Huang et al. further discloses response parameters define the amplitude, phase and frequency of movement for each of the force generators (Col. 9, lines 44 –

49). However, Huang et al. fails to disclose the exact directions (or phase shifts) in which the response parameters operate.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to accommodate for any phase shift or damping force frequency generation since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller,* 105 USPQ 233.

Regarding claims 11, 12, 14, 28, 29 and 31, Huang et al. discloses all of the elements as set forth above, however, Huang et al. fails to disclose force generators (actuators) for creating the damping force include piezoelectric, hydraulic or magnetostrictive devices.

Redmond et al. discloses all of these types of actuators for creating a damping force in the shank of a machine tool in order to offset a detected vibration (Col. 3, lines 9 – 12).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the force generators of Huang et al. to be comprised of piezoelectric, hydraulic or magnetostrictive devices as taught by Redmond et al. since Redmond et al. teaches the use of these actuators to dampen vibrations in a cutting tool since they can be mounted in a recess of the tool structure (Col. 3, lines 9 – 10).

Huang et al. and Redmond et al. disclose all of the elements as set forth in the above rejections, however, Huang et al. and Redmond et al. fail to explicitly disclose the a damping force out-of-phase with an oscillatory motion by other than 180 degrees.

Nachtigal et al. discloses a method for damping feed-back vibrations of a tool during machining of a workpiece comprising the steps of sensing a vibration in a tool and causing a

damping device to generate a damping force having substantially the same frequency as the oscillatory motion and out-of-phase with the motion by less than 180 degrees (Col. 7, line 51 – Col. 8, line 1).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the damping devices of Huang et al. and Redmond et al. to provide a damping force out of phase by other than 180 degrees since Nachtigal et al. teaches that in a machining operation it has been shown that some tools cease to vibrate when a damping force out of phase by other than 180 degrees is applied to the tool (Col. 7, line 51 – Col. 8, line 1).

3. Claims 13 and 30 are finally rejected, as necessitated by amendment, under 35 U.S.C. 103(a) as being unpatentable over Huang et al. in view of Redmond et al. in further view of Nachtigal et al. and in further view of Streicher.

Huang et al., Redmond et al. and Nachtigal et al. disclose all of the elements as set forth in the above rejections, however, though they do list a number of damping elements to offset a detected vibration in a machine tool, they fail to explicitly disclose that along with hydraulic, piezoelectric and electromagnetic elements, a pneumatic damping element may be used.

Streicher discloses an apparatus similar to the instant invention which utilizes a number of elements to dampen a vibration in a machining tool. Streicher explicitly discloses an apparatus and method include using a pneumatic damping element (along with the electrical, hydraulic or mechanical damping elements) to counteract tool vibration during a cutting operation.

4. Claims 15, 17 and 32 are finally rejected, as necessitated by amendment, under 35 U.S.C. 103(a) as being unpatentable over Huang et al. in view of Redmond et al. in further view of Nachtigal et al. and in further view of Mubaslat.

Huang et al., Redmond et al. and Nachtigal et al. disclose all of the elements as set forth in the above rejections, however, they fail to disclose an amplitude of the damping device is gradually decreasing.

Mubaslat discloses a cutting tool that experiences vibrations during operation and wherein a damping device is operable to counteract this vibration. The "pulses" (50) eliminate vibration and decrease to a zero amplitude (Col. 5,lines 52 – 57).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the damping effect of Huang et al., Redmond et al. and Nachtigal et al. to decrease in amplitude since Mubaslat teaches a control system for a cutting machine that controls the phases of the pulses with respect to oscillation as well as the widths and amplitudes of the damping device in order to rapidly reduce vibration (Col. 5, lines 48 – 56).

Response to Arguments

5. Applicant's arguments with respect to claims 1, 16 and 18 have been considered but are moot in view of the new ground(s) of rejection, necessitated by amendment. Newly discovered reference Nachtigal et al. teaches offsetting a damping force's phase in a machine tool by 135 degrees to eliminate chatter in the tool and workpiece.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

7. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Faxing of Responses to Office Actions (**UPDATED**)

8. In order to reduce pendency and avoid potential delays, TC 3700 is encouraging FAXing of responses to **ALL OFFICE ACTIONS** directly into the Group at **(703) 872-9306**. This practice may be used for filing papers not requiring a fee. It may also be used for filing papers which require a fee by applicants who authorize charges to a PTO deposit account. Please identify the Examiner and art unit at the top of your cover sheet. Papers submitted via FAX into TC 3700 will be promptly forwarded to the Examiner.

9. PLEASE NOTE: the **fax number in the above paragraph has changed**. It is to be used for all responses, **including after-final communications**.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Walsh whose telephone number is (703) 605-0638. The examiner can normally be reached on Monday - Friday 8:30 A.M. to 6:00 P.M., with every-other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrea Wellington can be reached on (703) 308-2159.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1148.

BDW
December 10, 2003

A. L. WELLINGTON
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700